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RESEARCH ARTICLE

Three species of bark beetles (Coleoptera: Curculionidae, Scolytinae) on *Pinus peuce* in Pirin Mountains in Bulgaria

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Abstract

In 2020 and 2021, three species of bark beetles (Coleoptera: Curculionidae, Scolytinae) were established on Macedonian pine (*Pinus peuce*) in the region of Vihren hut in Pirin Mts. Branches, damaged by snow were collected and studied in laboratory conditions. As a result, 24 specimens of *Ips amitinus* were reared in 2020 and 81 specimens of *I. amitinus*, *Crypturgus pusillus* and *Pityogenes chalcographus* in 2021. The most abundant species was *I. amitinus* with 75.2%, followed by *P. chalcographus* (21.9%) and *C. pusillus* (2.9%).

Keywords

bark beetles, Macedonian pine, Pirin Mts., Bulgaria

Introduction

The Balkan endemic Macedonian pine (*Pinus peuce* Griseb.) is distributed in mountain areas of North Macedonia, Bulgaria, Greece, Kosovo, Albania and Serbia. It grows between 1000 and 2300 m a.s.l., where it is affected by a wide range of abiotic and biotic factors, including many insect pests. In Bulgaria, the studies on harmful entomofauna of *P. peuce* are still fragmentary, although some species, mainly bark

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beetles (Coleoptera: Curculionidae, Scolytinae), have been reared and reported in association with this host (Tschorbadjiew, 1927, 1929).

This note reports three species of bark beetles found on Macedonian pine in Pirin Mts. in Bulgaria.

Material and Methods

The studies were conducted in the region of Vihren hut in Pirin Mts. Cuttings of broken by snow branches of *P. peuce* (approximately 25-30 cm in length with diameter 2-8 cm) were collected on 3 August 2020 and 26 July 2021 from 150 year-old natural stands at an altitude of 1980 m a.s.l. and with geographical coordinates 41.761809 N, 23.417165 E.

The cuttings were transported to the Forest Research Institute in Sofia. They were placed in photoeclectors at room temperature (18-22 °C). The samples were examined weekly to detect the insect emergence.

At the end of the studied period, the barks of the cuttings were removed and the samples were analysed in detail. The emerged bark beetles were identified following the keys of Karaman (1971) and Grüne (1979) and were deposited in the entomological collection of the Forest Research Institute.

Results

Three species of bark beetles were reared from branches of *P. peuce*: *Crypturgus pusillus* (Gyllenhal, 1813), *Ips amitinus* (Eichhoff, 1871) and *Pityogenes chalcographus* (Linnaeus, 1761) (Table 1). In 2020, *I. amitinus* emerged during the period 31 August – 23 September, and in 2021, *C. pusillus*, *I. amitinus* and *P. chalcographus* emerged during the period 10-17 August.

Ips amitinus developed in branches with a diameter of 5-8 cm, while *C. pusillus* and *P. chalcographus* – in branches with a diameter 2-4 cm.

In total, the most abundant within the bark beetle complex was *I. amitinus* (75.2%), followed by *P. chalcographus* (21.9%) and *C. pusillus* (2.9%) (Table 1).

Table 1. Bark beetles reared from branches of *Pinus peuce* from Pirin Mts.

Species	2020		2021		Total	
	N	%	N	%	N	%
Crypturgus pusillus (Gyllenhal)	0	0	3	3.7	3	2.9
Ips amitinus (Eichhoff)	24	100.0	55	67.9	79	75.2
Pityogenes chalcographus (Linnaeus)	0	0	23	28.4	23	21.9
Total	24	100.0	81	100.0	105	100.0

Discussion

Crypturgus pusillus has been omitted in the last catalogues of the Palaearctic Scolytinae (Lobl, Smetana, 2011; Alonso-Zarazaga et al. 2017), and the new record from Pirin Mts. confirms its distribution in Bulgaria.

Ips amitinus, *P. chalcographus* and *C. pusillus* were previously reared from Macedonian pine from Pirin Mts. (Tschorbadjiew, 1927, 1929; Dimitrov, 1963). Other species of bark beetles were also reported as pests of *P. peuce* in the region: *Hylastes ater* (Paykull, 1800), *Hylurgops palliatus* (Gyllenhal, 1813), *Pityogenes bistridentatus* (Eichhoff, 1878), *P. chalcographus* (Linnaeus, 1761), *P. quadridens* (Hartig, 1834) (Tschorbadjiew, 1927, 1929), *Pityogenes conjunctus* (Reitter, 1887) (Pfeffer, 1984) and *Ips sexdentatus* (Börner, 1776) (Dimitrov, 1963). In addition, *Pityophthorus knoteki* Reitter, 1898 was reported on *P. peuce* from Rila Mts. (Pfeffer, 1936) and *Tomicus piniperda* (Linnaeus, 1758) – from Rila, Vitosha and Rhodope Mts. (Tschorbadjiew, 1927).

In North Macedonia, the bark beetles *Tomicus minor* (Hartig, 1834), *Pityogenes bidentatus* (Herbst, 1784) and *Pityophthorus pityographus* (Ratzeburg, 1837) were also known to develop on *P. peuce* (Karaman, 1971).

With the exception of bark beetles, the weevil *Pissodes pini* (Linnaeus, 1758) (Coleoptera: Curculionidae) and longhorn beetles *Acanthocinus aedilis* (Linnaeus, 1758) and *Monochamus galloprovincialis pistor* (Germar, 1818) (Coleoptera: Cerambycidae) were recorded on *P. peuce* in Pirin Mts. (Dimitrov, 1935). In other regions of Bulgaria, the longhorn beetles *Rhagium* (*Rhagium*) *inquisitor inquisitor* (Linnaeus, 1758) and *Acanthocinus* (*Acanthocinus*) *griseus* (Fabricius, 1793) were also reared from fallen stems and broken branches of *P. peuce* (Doychev et al., 2017).

In conclusion, it should be noted that the bark beetles and other xylophagous insects of *P. peuce* in Bulgaria have not been well studied yet. This note is the second record for the trophic association between the three bark beetles and *P. peuce*. More than 20 species of longhorn beetles (Angelov, 1967; Ganev, 1984, 1986; Rapuzzi, Georgiev, 2007, etc.) and more than 20 species of jewel beetles (Weidlich, 1988, 1989; Sakalian, 2003, etc.) developing on conifers have been found in Pirin Mts. The Macedonian pine is a potential host for them, therefore more species could be established in future detailed studies.

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